This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

Roland SYSTEM-1m Synthesizer

Self-Patching and Other Simple Experiments

— Project Notes —

O. Guy Morley

January 2, 2021 (slightly revised: January 10, 2021)

Introduction

Recently, Roberto bought a used Roland SYSTEM-1m. Roberto chose a keyboard-less music synthesizer because he'd rather use his digital piano to control it. While the synth is internally all digital, it sounds and feels more like an analog one, with a good sound modeling and a bunch of control knobs and sliders arranged in an old-fashioned manner.

Also, the synth is "semi-modular," with a fair number of patch points. So, he got a set of patch cables (Hosa Hopscotch Patch Cables, 3.5 mm TS with 3.5 mm TSF Pigtail to 3.5 mm TS, CMM-500Y-MIX). This assortment contains mono mini patch cables of five different lengths. One end of each cable is split so that another cable can be connected.

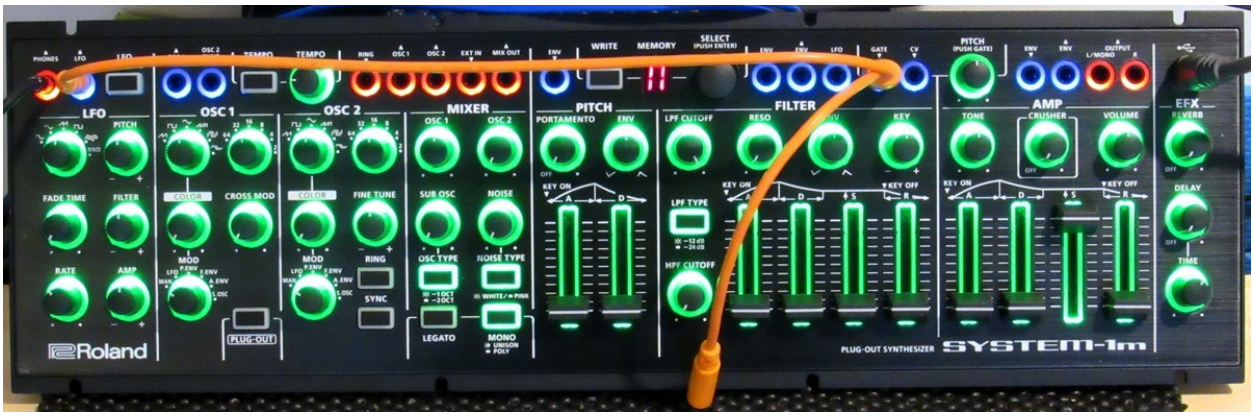
Then, he watched some YouTube videos about "self-patching." However, the videos he found were not very helpful. In one video, the person almost randomly patched various points. Sure, that created a bunch of unusual sounds, but the person didn't seem to have a good grasp of how "gate" and "CV" work. So, Roberto started his own experiments, mainly to educate himself. This document is a record of what he did.

Note: For all patching experiments, the MONO mode (lower middle section) must be chosen. The UNISON and POLY modes disable all the patch points. In this document, the names of patch points, control, and features associated with SYSTEM-1m are (for the most part) underlined.

Disclaimer: Not responsible for potential negative consequences of using the information in this document.

Self-Running Patch (#1)

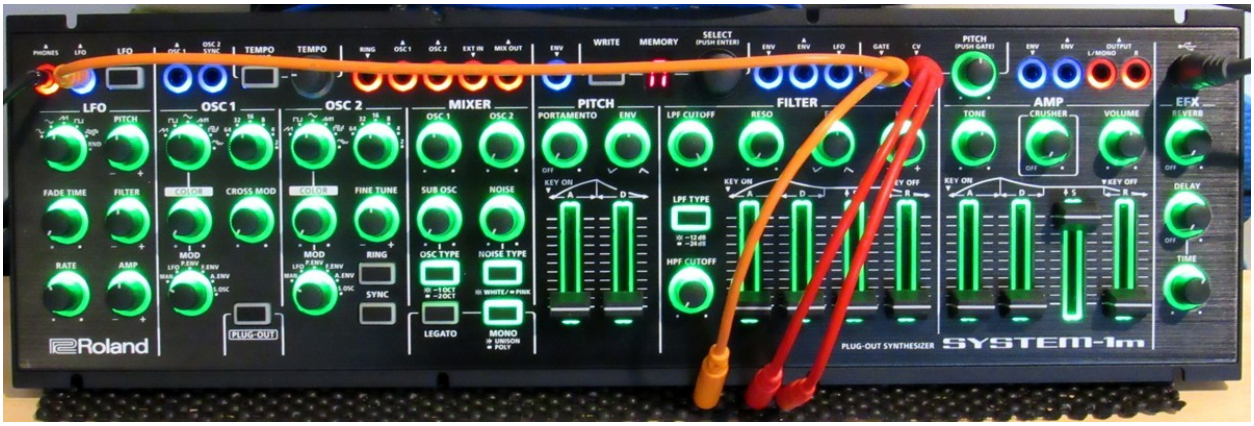
The first experiment is to keep the synth running without user intervention. Roberto tries to do this by controlling the gate automatically with the onboard LFO. So, Roberto connected LFO out to GATE in with a patch cable as in the photo below.



Here is the left half of the above image enlarged.

Note that when the LFO is used to control the gate, LFO KEY TRIG (upper-left section) needs to be set to off (unlit). Otherwise, the LFO won't start.

At this point, Roberto realized that using just the GATE in patch point does not control the gate. There is no self-running yet; the keyboard (via MIDI In) is still active. For SYSTEM-1m to switch from the keyboard to the external gate signal, both the GATE in and CV in jacks must be used as shown below.



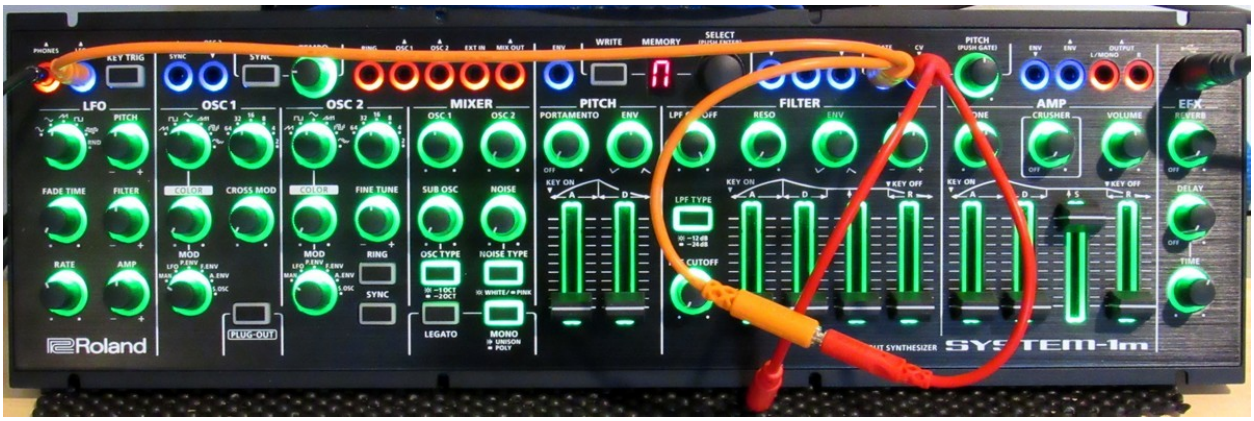
At this point, no actual signal is provided to CV in. Nevertheless, the synth started to self-run. Roberto is able to tell this because he hears a clicking sound corresponding to the LFO rate. Roberto verifies this by adjusting the LFO rate. But without a signal to CV in, the CV voltage is 0v and the corresponding pitch is the lowest and inaudible.

However, it is still possible to raise the pitch and hear the sound associated with self-running. One way to do this is to raise the pitch by turning the LFO PITCH knob clockwise *and* choose OSC 1 feet of 2 as shown below.

Note that if the CV key follow setting had been changed from the default value, the outcome may be different. More on CV key follow in the next section.

Self-Running Patch (#2)

Next, Roberto returns the LFO PITCH to the 12 o'clock position and OSC1 feet to 16. Since the LFO provides a signal ranging from -10v to +10v, this can also be fed to CV in as well as to GATE in, with two pigtail patch cables (shown below).



Then, Roberto hears the sound corresponding to the shape of the LFO wave form (e.g., sine, triangular, or sawtooth). However, since the range of CV is between 0v and +10v, the duration corresponding to the negative half of the LFO signal still won't be heard.

After this, Roberto chooses the square wave. There is no sound. This is because the square wave is either -10v or +10v. The only positive value of the square wave is 10v and it is way above our audible range. However, SYSTEM-1m has a way to change the sensitivity to the CV input. This is called CV key follow. So, Roberto tries to lower the CV sensitivity so that he can hear the sound. Then, the actual input of +10v can be interpreted as, say, 5v. To do this, he presses and hods the NOISE TYPE button (below).

Then, the MEMORY display (upper middle section) shows the CV key follow value (default is 0). While still holding the NOISE TYPE button, Roberto turns the SELECT knob counterclockwise. The MEMORY display shows a dot at the upper-left corner, indicating that the value is negative. As he turns the knob, the digit in the MEMORY display changes from 0 to 9 and then, again from 0 to 9, repeatedly. When the digit changes from 9 to 0, the LED of the jacks to the left of the WRITE button lights up one by one. The number of lit LEDs to the left of the WRITE button corresponds to the multiples of ten. This way, a two-digit number (negative, if there is a dot) can be shown and that is the CV key follow value. If the CV key follow is sufficiently lowered, even the positive position of the square wave (actual input of +10v) can become audible.

Note that when the keyboard is being used, the setting of CV key follow is irrelevant.

Self-Running Patch (#3)

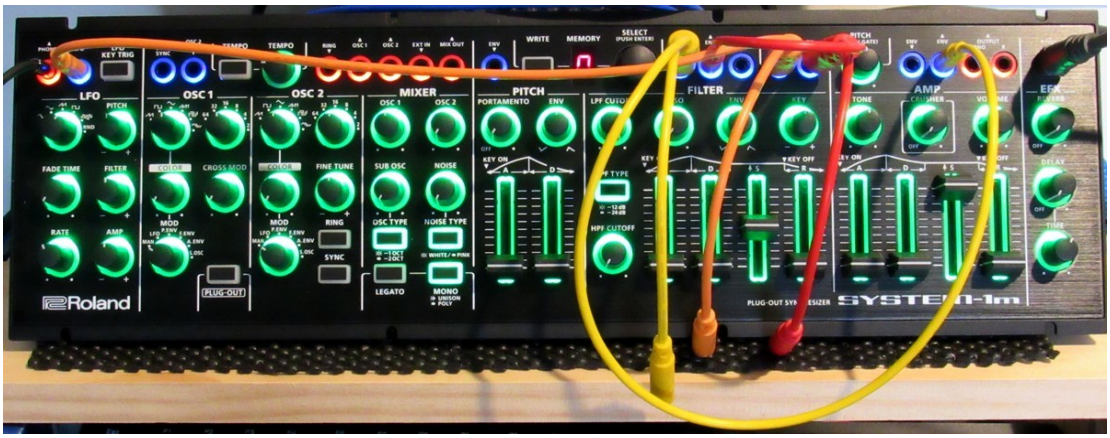
Roberto continues to experiment with the square wave position with different patching. This time, he uses the PITCH section to increase the pitch. First, he feeds the LFO out to both GATE in and ENV in of the PITCH section. The CV in jack still needs to be inserted but not actually connected to any other patch point.

This way, the LFO signal is fed to the AD envelope generator of the PITCH section. This envelope generator is triggered only at the beginning of the gate and holds the voltage till the end of the gate. The actual impact on the pitch is determined by the ENV knob in the PITCH section. Roberto turns the ENV knob (PITCH section) clockwise and the PITCH knob (LFO section) also clockwise.

This can raise the pitch to a mid range.

Self-Running Patch (#4)

The previous methods do demonstrate ways of self-running. However, the control of the pitch was rather ad hoc. The next approach is more disciplined. However, Roberto needs to sacrifice the envelope generator of the FILTER section for this purpose. Now, Roberto uses the output of the FILTER envelope generator, which can provide voltage between 0 and 10v. In order to compensate the loss of the envelope generator in the FILTER section, he uses the AMP envelope generator also for the FILTER section.

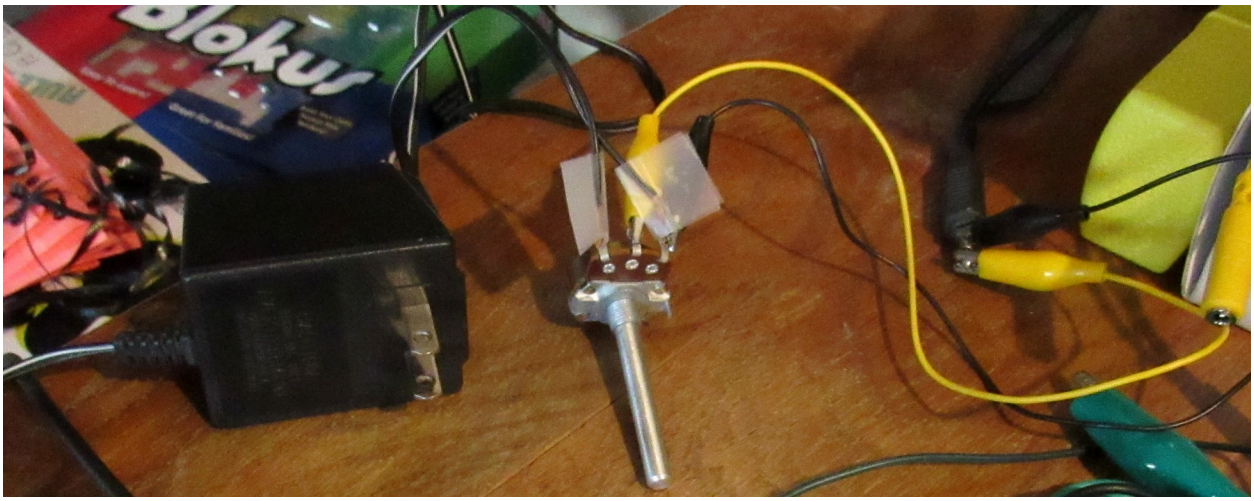


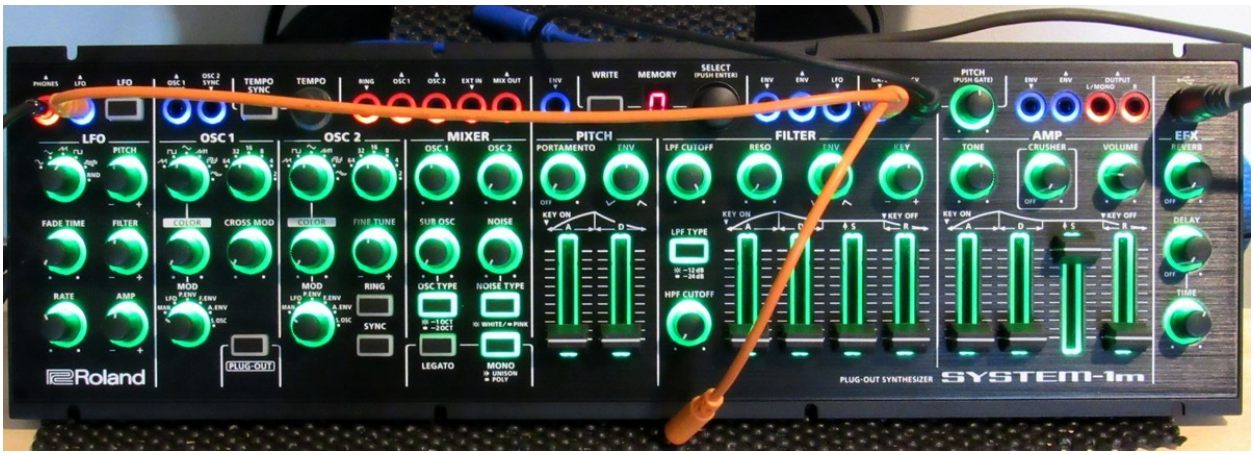
Then, the S slider of the FILTER section fixes the pitch. Since the range of the slider and the

range of CV are both between 0v and 10v, the position of the slider directly corresponds to the generated pitch.

Using External Constant Voltage Supply to CV

Of course, it is a waste to use an envelope generator only to provide a constant voltage. So, Roberto improvises an external source of constant voltage. He has a junk AC adapter, whose output is 9v (an alternative would be a 9v battery). Then, he connects this 9v supply to the both ends of a potentiometer; he happens to have one rated 1MΩ. Then, he connects the mid point and the ground to the tip and ground of a patch cable, respectively, and then, connects the other end of the patch cable to the CV in of the synth.



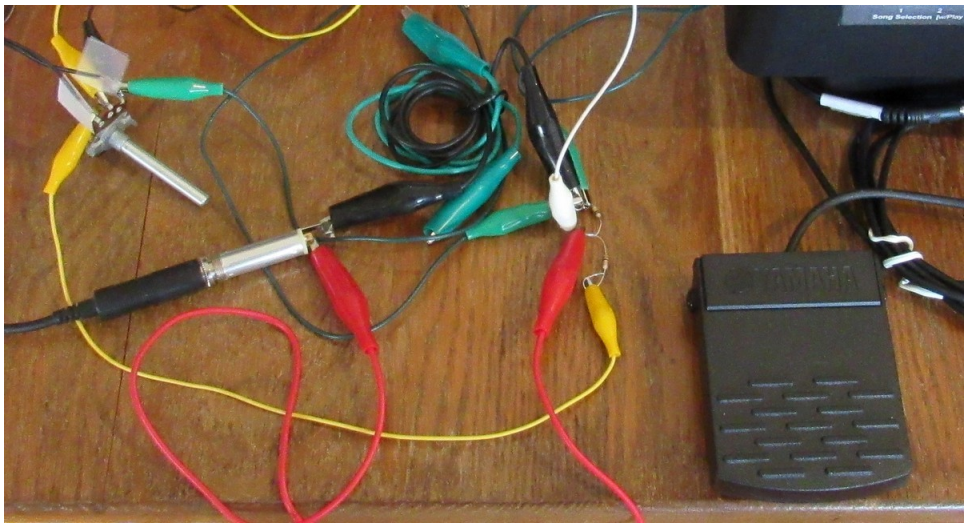


Then, all the functionality of SYSTEM-1m, except for the LFO, can be used for shaping the sound. Now, the pitch can be adjusted by the potentiometer.

Using a Foot Pedal for Gate

All the previous experiments of self-running was more for learning. However, Roberto actually comes up with a somewhat practical idea. He tries to use a spare keyboard foot switch to control the gate. Then, this setup can function as an alternative to the PITCH (PUSH GATE) knob/button. But there is an advantage. By using a foot pedal for controlling the gate, he can use his both hands to adjust the synth.

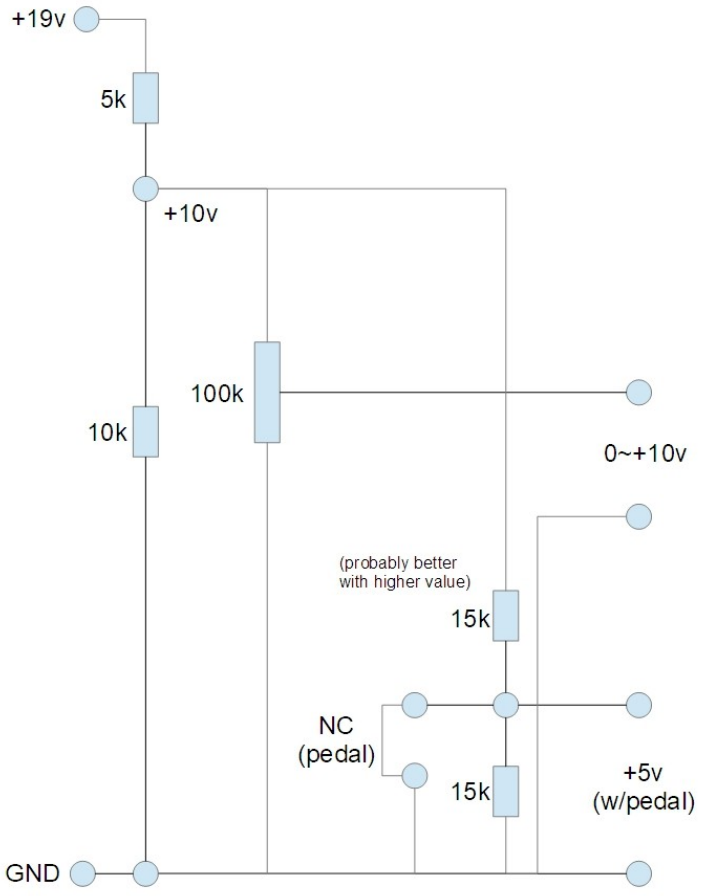
To do this, Roberto used two 100kΩ resisters to drop the 9v to about 4.5v. His foot pedal is the NC (normally closed) type. So, he connected the pedal to the both ends of one resistor so that only when the pedal is pressed, the 4.5v voltage is supplied. Then, this output is connected to one end of a patch cable. The other end is connected to the GATE in jack.



This way, all the functions of SYSTEM-1m can be used for sound creation. Since the gate is no longer controlled by the LFO, the LFO KEY TRIG button can be used as well.

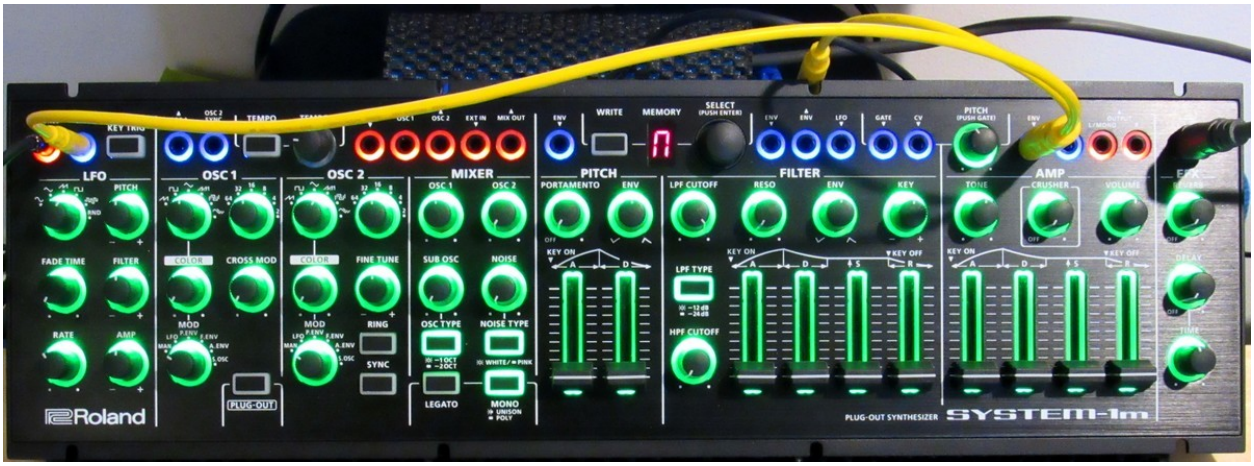
Later, Roberto slightly modified the contraption and put it in a plastic bottle.

Here is a diagram.



Self-Running Patch (#5)

Roberto also realizes that self-running is possible without using the GATE in and CV in jacks. By connecting LFO out with ENV in of the AMP section, the synth engages the AMP even without the gate signal. In case the LFO is not yet running, you might to start it, e.g., by pushing the PITCH (PUSH GATE) button or pressing the (connected) keyboard.



Then, the synth runs continuously. He experiments with various LFO settings and tries other sections of the synth. It is particularly interesting to use the EFX section. In this case, the keyboard is still active. So, he can also use it to change notes.

Next, Roberto provides the external constant voltage to the ENV in of the AMP section. Then, the synth continues to run. Again, the keyboard is still active. So, the synth holds the last note until the next one is played.

Yet another experiment is to connect the foot pedal to the same ENV in. In this case, the AMP is on only when the pedal is pressed. And the keyboard is still active. So, it is possible to control the synth in an interesting manner.

Self-Patching Example (Pitch Bend During Release)

The AD envelope generator in the PITCH section is sufficient for a variety of pitch bending applications. However, Roberto also wants to control the pitch by the R (Release) amount of an ADSR generator. That is, the pitch bend *after* the gate turns off.

This can be done by replacing the PITCH section's AD envelope generator with the FILTER section's ADSR envelope generator. To do this, Roberto connects ENV out of the FILTER section to ENV in of the PITCH section.

Then, it would be more appropriate for the FILTER section to use the envelope generator of the AMP section. So, Roberto connects the AMP section's ENV out to the FILTER section's ENV in. The AMP envelope generator is now shared by both the AMP and FILTER sections.

Now, this is slightly tricky. But the ENV knob in the PITCH section controls the amount of pitch bending using the envelope generator in the FILTER section. The ENV knob in the FILTER section controls the amount of filtering using the envelope generator in the AMP section.

This way, the pitch of the sound can go up or down, depending on the polarity of the ENV knob in the PITCH section. However, due to the way the envelope generator is used, the starting pitch is affected. So, in some cases, it may be necessary to adjust the starting pitch. This can be done in a few different ways.

One way is to use the OSC 2's FINE TUNE. However, the amount of change is small (as it is for fine tuning). Probably to compensate this limitation, SYSTEM-1m is also equipped with OSC 2 Coarse Tune function. To use it, Roberto needs to push both the RING and SYNC buttons and then turn the SELECT (PUSH ENTER) button.

The MEMORY display and the number of LEDs to the left of the WRITE button indicate the amount of positive or negative OSC 2 shift (by the number of semi-notes). Although not in the manual, Roberto also notices that pushing the RING and SYNC buttons and turning the FINE TUNE knob changes OSC 2 Coarse Tune value. After releasing the two buttons, the FINE TUNE knob can be used to "fine tune" furthermore.

External Input

Roberto also experiments with the EXT IN jack. He connects to it the output of a handy recorder/microphone (Zoom H2n, which can provide a line level output). Then, the level of EXT IN is controlled by the SUB OSC knob (i.e., SUB OSC is disabled). This signal goes through the FILTER, AMP, and EFX sections. Now, Roberto has to open the gate manually (e.g., using his constant voltage or pedal) and keep it open. Still, he can use the LPF CUTOFF, RESO, HPF knobs in the FILTER section; the TONE, CRUSHER, and VOLUME knob in the AMP section; all the effects in the EFX section; and the relevant functions of the LFO section. Theoretically speaking, if the input signal level is high enough, the input signal may well open the gate. Roberto has not yet tried this possibility.

Using the REVERB/DELAY and a sort of vibrato effect (LFO control of the FILTER and AMP) for the microphone, Roberto sets up the synth with his computer and audio system to create a makeshift "karaoke" machine. It was an instant hit with his family members.

Conclusion

First, SYSTEM-1m is extremely versatile synthesizer by itself. Roberto rarely needs anything outside of the box. In addition, without additional components, the usefulness of patch points may be limited. Nevertheless, he can still enjoy a variety of self-patching and the benefit of a few simple additional contraptions. Also, if someone can create a YouTube video based on this document, that might be fun.

Summary of patch points (mainly those discussed in this document):

- LFO out: -10v ~ +10v
- ENV in (PITCH section): 0v ~ +10v
- ENV in/out (FILTER section): 0v ~ +10v
- GATE in: Turns on/off at +3v
- CV in: 0v ~ +10v (1oct/v)
- ENV in/out (AMP section): 0v ~ +10v